

**Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal Form**

Section 1. General administrative information

Provide scientific input to the PATH process.

9600801

Business name of agency, institution or organization requesting funding

National Marine Fisheries Service
Northwest Fisheries Science Center
2725 Montlake Blvd. E.
Seattle, WA 98112

Business acronym (if appropriate) NMFS/NWFSC

Proposal contact person or principal investigator:

Name	<u>John G. Williams</u>
Mailing Address	<u>NWFSC, Fish Ecology Division</u>
	<u>2725 Montlake Boulevard, East</u>
City, ST Zip	<u>Seattle, WA 98112</u>
Phone	<u>206-860-3277</u>
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Email address	<u>john.g.williams@noaa.gov</u>

Subcontractors. List one subcontractor per row; to add more rows, press Alt-Insert from within this table

Organization	Mailing Address	City, ST Zip	Contact Name
N/A			

NPPC Program Measure Number(s) which this project addresses.

Unknown

NMFS Biological Opinion Number(s) which this project addresses.

NMFS Biological Opinion Section VIII.A.17

Other planning document references.

If the project type is “Watershed” (see Section 2), reference any demonstrable support from affected agencies, tribes, local watershed groups, and public and/or private landowners, and cite available documentation.

N/A

Subbasin.

N/A

Short description.

Provide scientific input into the PATH process to help assess juvenile passage models and life cycle models so that an understanding exists about the hypotheses upon which the models are based and the probability that the different models provide expected increases in salmon stocks based on changes to hydropower, harvest, hatcheries, and habitat.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish		Construction		Watershed
	Resident fish		O & M		Biodiversity/genetics
	Wildlife		Production	+	Population dynamics
+	Oceans/estuaries		Research	+	Ecosystems
+	Climate	X	Monitoring/eval.	X	Flow/survival
	Other		Resource mgmt	+	Fish disease
			Planning/admin.		Supplementation
			Enforcement		Wildlife habitat enhancement/restoration
			Acquisitions		

Other keywords.

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
9600801	Input to PATH process	Numerous entities (fisheries agencies, tribes, universities, and other outside contractors are responsible for providing input to PATH. Inputs from all entities are necessary in order for PATH to produce a product that will be acceptable to the region

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2, 3	Objective	Task a,b,c	Task
1	Provide scientific input to PATH so that documents that include analyses on model outputs and expectations of increases in stock sizes based on changes in hydropower, harvest, hatcheries, and habitat are useful to the region.	A	Participate in PATH-related technical meetings (work group sessions) and workshops. Forums cover topic matters involving mainstem fish passage issues and ecological processes affecting salmon stocks within the Snake/Columbia Basin
		B	Review and critique technical materials produced by other members participating in the PATH process. Materials to be reviewed include; models, hypotheses and assumptions within those models, and analyses that may support or refute certain hypotheses. Products and analyses from the Harvest, Habitat, and Hatchery groups, as well as the Hydro group will be included in this activity
		C	Assess the relevance of empirical evidence in evaluating management actions being considered as recovery strategies. In particular, identify recent empirical evidence that is not necessarily incorporated within existing models, but is important in evaluating the efficacy of management alternatives being considered as strategies for salmon recovery

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	10/1999	9/2000	100%

Schedule constraints.

The PATH process is dependent on input from a number of entities. If some groups do not get their input into the process in time, the deadlines are not met.

Completion date.

2000

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel		39,000
Fringe benefits		8,000
Supplies, materials, non-expendable property		
Operations & maintenance		1,400
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		
PIT tags	# of tags:	
Travel		7,500
Indirect costs		19,100
Subcontracts		
Other		
TOTAL		75,000

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	75,000			
O&M as % of total	1.9%			

Section 6. Abstract

Scientific input into the PATH assists in the development of identifying and assessing key alternative hypotheses relating to the Columbia River salmon ecosystem. The Northwest Fisheries Science Center (NWFSC) scientists provide empirical data for use in modeling exercises and provide critiques on use of all data and processes used in the modeling that leads toward recommendations about the utility of modifying harvest, habitat, hatcheries, and hydropower as means to recover stocks of anadromous fish in the Columbia River Basin listed as threatened or endangered under the Endangered Species Act.

Section 7. Project description

a. Technical and/or scientific background.

The 1995 Biological Opinion (Section VIII.A.17) states that "The BPA shall participate with NMFS in activities to coordinate the regional passage and life cycle models and to test the hypotheses underlying those models. PATH was an outgrowth of this process. The PATH forum began in 1995 and has been ongoing since. Scientists from the NWFSC have participated in PATH since its inception and continue to do so.

b. Proposal objectives.

NWFSC scientists assist in the production of a PATH document that includes analyses on model outputs and expectations of increases in stock sizes based on changes in hydropower, harvest, hatcheries, and habitat through critiques of methods, the review of model outputs, submission of new empirical data or analyses for inclusion in the final work products, and development of analyses to support or refute different data sets.

c. Rationale and significance to Regional Programs.

The PATH process is directed by the NMFS Biological Opinion and it needs rigorous scientific input and review in order to have useful products on which to make decisions about changes in habitat, harvest, hydropower, or hatcheries to bring about recovery of Columbia River Basin anadromous fish stocks.

d. Project history

PATH has been an ongoing process since 1995. Scientists from the NWFSC have been active participants since its initiation, but have only received funding for their input since FY98.

e. Methods.

NWFSC scientists attend workshops, meetings, and forums to provide their input into the PATH process. They also write critiques and analyze data for input to other PATH scientists in the overall process of developing a final PATH product.

f. Facilities and equipment.

Work is performed at the Northwest Fisheries Science Center

g. References.

A large number of PATH documents have been produced and are in the process of production. The major product to date was the Plan for Analyzing and Testing Hypotheses (PATH) Final report on Retrospective Analyses, dated 10 September 1996. This document has a number of subsections related to habitat, harvest, hatcheries, and hydro. NWFSC provided much of the information in the hydropower section.

Presently, PATH is working on a Preliminary Decision Analysis for Spring Chinook Salmon, with the latest draft dated 17 December 1997.

Section 8. Relationships to other projects

The scientific input identified in this project complements the efforts of scientists from a number of other regional entities.

Section 9. Key personnel

John G. Williams

Supervisory Fishery Biologist, 0.4 FTE

B.S. (1969) in Fisheries, University of Washington. M.S. (1975) in invertebrate biology, fisheries science, University of Washington. Ph.D. (1978) in ecology, invertebrate biology, quantitative analysis, University of Washington.

1987 to present: National Marine Fisheries Service, Northwest Fisheries Science Center, Fish Ecology Division.

Dr. Williams is a Supervisory Fishery Biologist and the Program Manager for Fish Passage in the Fish Ecology Division. He supervises senior biologists and statisticians who conduct research related to juvenile passage at dams and the survival and migrational behavior of juvenile fish passing through the hydropower system in the Columbia River Basin. This Program conducts approximately \$3M of research annually and employs 20 full-time and 50 part-time people. He is responsible for the conceptualization of ideas, development of research methodologies, oversight of field research, and reporting of results in annual reports or peer-reviewed publications. In addition, Dr. Williams participates on a number of committees or in forums (such as PATH) that review Columbia River fisheries research related to fish passage issues. Dr. Williams is also on the affiliate faculty of the School of Fisheries at the University of Washington.

Williams, J. G. and G. M. Matthews. 1995. A review of flow and survival relationships for spring and summer chinook salmon, *Oncorhynchus tshawytscha*, from the Snake River Basin. Fish. Bull. 93:732-740.

Williams, J. G., and M. H. Gessel. 1993. Fish diversion and screening devices: Is there a relationship to fish behavior? In K. Bates (editor), Proceedings of the symposium on fish passage policy and technology, September, 1993, Portland, OR, p. 135-140. Amer. Fish. Soc., 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199.

Williams, J. G. and M. E. Tuttle. 1992. The Columbia River: fish habitat restoration following hydroelectric dam construction. In G. W. Thayer (editor), Restoring the Nation's Marine Environment, p. 405-422. Maryland Sea Grant College, College Park.

Williams, J. G. 1989. Spring and summer chinook salmon from the Snake River - can they be saved? Regulated Rivers; Research and Management 4:17-26.

Smith, S. G., Muir, W. D., E. E. Hockersmith, S. Achord, M. B. Eppard, T. E. Ruehle, J. G. Williams, and J. R. Skalski. 1998. Survival estimates for the passage of juvenile salmonids through Snake River dams and reservoirs, 1996. Annual report to Bonneville Power Administration, Portland, OR, Contract DE-AI79-93BP10891, Project 93-29, and U.S. Army Corps of Engineers, Walla Walla, WA, Project E86940119, 150 p.

Steven G. Smith

Mathematical Statistician (no FTE, moneys to cover travel costs only):

B.S. (1985) in Computer Science, Utah State University. M.S. (1987) in Biostatistics, and Ph.D. (1991) in Quantitative Ecology and Resource Management, University of Washington. National Marine Fisheries Service, Northwest Fisheries Science Center, Fish Ecology Division (1994 to present).

Dr. Smith has worked as a Mathematical Statistician for the National Marine Fisheries Service since 1994, during which time his principal responsibility has been analysis of survival of migrating PIT-tagged juvenile salmonids. He was previously a graduate student and then professional staff member at the University of Washington (1987-1994), where he developed statistical models for capture-recapture data and computer software (SURPH) to implement them, and helped plan and analyze the first two years of the joint NMFS/UW Snake River survival study. Since spring 1995, Dr. Smith has participated in the region's PATH (Plan for Analyzing and Testing Hypotheses) process.

Muir, W.D., S.G. Smith, E.E. Hockersmith, S.Achord, R.F. Absolon, P. A. Ocker, B.M.Eppard, T.E. Ruehle, J.G. Williams, R.N. Iwamoto, and J.R. Skalski.

1996. Survival estimates for the passage of yearling chinook salmon and steelhead through Snake River dams and reservoirs, 1995. Annual report to Bonneville Power Administration, Portland, OR, Contract DE-AI79-93BP10891, Project 93-29, and U.S. Army Corps of Engineers, Walla Walla, WA, Project E86940119, 150 p.

Smith, S. G., J. R. Skalski, W. Schlechte, A. Hoffmann, and V. Cassen. 1994. Statistical Survival Analysis of Fish and Wildlife Tagging Studies. SURPH.1 Manual. (Available from Center for Quantitative Science, HR-20, University of Washington, Seattle, WA 98195.)

Smith, S. G., W. D. Muir, E. E. Hockersmith, M. B. Eppard, and W. P. Connor. 1997. Passage survival of natural and hatchery subyearling fall chinook salmon to Lower Granite, Little Goose, and Lower Monumental Dams. Pages 1-65 In J. G. Williams and T. C. Bjornn, editors. Fall chinook salmon survival and supplementation studies in the Snake and Lower Columbia River Reservoirs, 1995. Annual Report to

***Bonneville Power Administration, Contract 93AI10891 and
the U. S. Army Corps of Engineers, Contract E86950141.***

Smith, S.G., Muir, W.D., E.E. Hockersmith, S. Achord, M.B. Eppard, T.E. Ruehle, J.G. Williams, and J.R. Skalski. 1998. Survival estimates for the passage of juvenile salmonids through Snake River dams and reservoirs, 1996. Annual report to Bonneville Power Administration, Portland, OR, Contract DE-AI79-93BP10891, Project 93-29, and U.S. Army Corps of Engineers, Walla Walla, WA, Project E86940119, 150 p.

Section 10. Information/technology transfer

Information will get disseminated through PATH documents and peer reviewed publications based on results of different sections of the PATH documents.